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DESIGN MEMORANDUM
ON
CARVERS HARBOR, VINALHAVEN, MAINE

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM 54, MASSACHUSETTS

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 Trapelo Road
Waltham 54, Mass.

Refer to
File No. NEDGW

SUBJECT: Design Memorandum for Carvers Harbor, Vinalhaven, Maine

TO: Chief of Engineers
ATTN: ENGOW-E
Department of the Army
Washington 25, D. C.

1. Reference is made to letter of 8 November 1962, Subject: "Work Allowances for Small Authorized Projects," which provided funds in the amount of \$17,000 for preconstruction planning, including design memorandum, on Carvers Harbor, Maine.

2. In accordance with EM1110-2-1150, Engineering and Design, Definite Project Studies, dated 15 January 1962, there are inclosed four (4) copies of the design memorandum on the subject project. The work to be undertaken involves dredging of ordinary material, boulders and ledge rock, with no special design or excavation problems. The design memorandum is approved in accordance with paragraph 6 (b) of the above-referenced authority.

3. Planning on this project is about 90% complete. Formal assurances of local cooperation have been executed. Bids are scheduled to be received 25 June 1963 and a request for allotment of construction funds will follow, based on the bids received.

1 Incl
Design Memo
(in quad)

P. C. HYZER
Brigadier General, USA
Division Engineer

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NEDGW

DESIGN MEMORANDUM
ON
CARVERS HARBOR, MAINE

14 June 1963

PERTINENT DATA

1. A summary of the physical features and costs of the existing project for Carvers Harbor, Maine is as follows:

<u>Features</u>	<u>Present Estimate (1963)</u>
Completed project modifications	\$ 16,000
Uncompleted project modifications	
Dredging and rock removal in	
10-foot anchorage area and	
6-foot access channel and	
turning basin	<u>218,000 *</u>
Total Project Cost	\$234,000

*Includes \$10,000 preauthorization study costs.

PROJECT AUTHORIZATION

2. Authorization. The uncompleted modification for the improvement of Carvers Harbor, Maine, authorized by the River and Harbor Act of 23 October 1962, provides for: an anchorage area 10 feet deep, extending from the present anchorage to within 50 feet of the northwesterly wharves, and a channel 6 feet deep and 75 to 150 feet wide for a distance of 500 feet to the northeast part of the harbor.

3. The project modification was authorized subject to the requirements that local interests agree to: (1) Provide without cost to the United States all lands, easements, and rights-of-way required for initial dredging and subsequent maintenance of the improvement upon request of the Chief of Engineers, including suitable areas as may be determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil, and also necessary retaining dikes, bulkheads, and embankments therefor or the costs of such retaining works; (2) Hold

and save the United States free from damages due to the construction works and maintenance of the improvement; (3) Provide and maintain without cost to the United States depths in berthing areas and local access channels serving the terminals commensurate with the depths provided in the related project areas; and (4) Provide and maintain without cost to the United States a suitable public landing at the northeast end of the harbor open to all on equal terms and with adequate supply facilities and access to the dredged channel, in accordance with plans approved by the Chief of Engineers.

4. The original project for Carvers Harbor was adopted by the River and Harbor Act of 3 June 1896. It consisted of dredging an area of about 23 acres in the central part of the harbor to a depth of 16 feet. This project was completed in 1903 at a cost of about \$43,000. The existing project was adopted by the River and Harbor Act of 4 March 1913 and provided for dredging to 10 feet two areas of about 3 and 4 acres in the southeastern part of the harbor adjoining the 23-acre area dredged under the previous project. This work was completed in 1914 at a cost of \$16,000 to the United States. There has been no maintenance work done in Carvers Harbor. The improvement considered in this design memorandum is the project modification authorized by the River and Harbor Act of 1962 as described in paragraph 2 above. No work has been initiated on this modification.

INVESTIGATIONS

5. Physical investigations carried out in support of the survey report contained in Senate Document No. 118, 87th Congress, 2d Session, were as follows:

- a. Hydrographic and topographic surveys were made in 1960;
- b. Subsequent to project authorization, hydrographic, topographic, probing, and boring surveys were accomplished in 1963. A conference with local officials was held in February 1963 to discuss the conditions of local cooperation and construction aspects of the proposed dredging.

LOCAL COOPERATION

6. The requirements of local cooperation as required by the authorizing document are stated in paragraph 3 above. Action by the Town Meeting held in March 1963 authorized the Selectmen to sign the assurances and appropriated the sum of \$20,000 to provide the necessary berth depths and public landing facilities. Prior to this appropriation, the Town had expended about \$10,000 in purchasing and improving the Town landing. A conference with representatives of the Town to discuss the project was held in February 1963 and concurrence with the general plan was obtained at that time. Investigation of the nature of the

dredging indicated impracticability of dredging by the hydraulic process so no spoil areas were requested or furnished.

7. The names of the principal officers and representatives contacted during the preconstruction planning phase are listed below:

Governor John H. Reed, State House, Augusta, Maine
Mr. Edward Langlois, General Manager, Maine Port Authority,
Portland, Maine
Mr. Robert E. Tolman, Selectman, Vinalhaven, Maine
Mr. Harold H. Haskell, " " "
Mr. Alton F. Oakes, Jr., " " "

LOCATION AND TRIBUTARY AREA

8. Carvers Harbor is located on the southwest side of Vinalhaven Island, Maine, at the mouth of Penobscot Bay, about 15 miles southeast of Rockland. The harbor consists of an outer and an inner harbor. The outer harbor is a rectangular body of water, 2400 feet across its mouth, between Norton Point on the west and Lane Island on the east, and extends 1200 feet inland to Potato Island, with depths ranging from 20 to 30 feet in the access channel. The inner harbor is the easterly of two coves, the common entrance to which lies between Potato Island and Norton Point, 1,000 feet to the west. It extends inland east of Dodge Point 2400 feet to the head of navigation, with an average width of 1200 feet and depths ranging from 13 to 27 feet in the access channel. The 16-foot deep area dredged under the original project is located in the central portion of the inner harbor and the 10-foot deep areas dredged under the existing project are located in the southeastern part of the inner harbor. The area between the northerly limit of the 16-foot depth project and the 1200 feet of improved waterfront has depths ranging from 2 to 6 feet below MLW.

9. Vinalhaven Island and numerous small adjacent islands comprise the Town of Vinalhaven. In 1960 the Town had a permanent population of 1273, most of whom were concentrated in Vinalhaven Village, located at the head of Carvers Harbor. The area is located in one of the largest lobster fishing grounds of the nation and is in a favorable geographical proximity to the Eastern Fishing Banks off the Gulf of Maine and Nova Scotia. Lobstering, fishing, and the preparation of frozen fish products, boat building and boat repairing, and the tourist-resort business are the principal commercial activities. Communication with Rockland on the mainland is maintained by telephone and daily ferry service.

PROJECT PLAN

10. The project is basically the same as shown in the authorizing document SD 118/87/2 and provides - (a) an extension to the present anchorage in the northwest section of the harbor to a line generally 50 feet from the existing wharves and to a depth of 10 feet at M.L.W.; (b) an access channel in the northeast section of the harbor 6 feet deep at M.L.W., 75 feet wide for a distance of 325 feet, increasing to a width of 155 feet for a distance of 175 feet, to form a basin. Overdepth dredging of 1 foot was recommended in the document.

11. Project costs determined were estimated on dredging quantities in terms of in-place measurement and provided for dredging to a 10-foot depth plus an allowance of 1 foot overdepth in the anchorage extension and to a 7-foot depth plus an allowance of 1 foot in rock and to a 6-foot depth plus an allowance of 1 foot depth in ordinary material in the access channel and basin. Sideslopes of 1 on 3 in ordinary material and 1 on 1 in rock were used. The 7-foot depth in rock in the northeast access channel and basin is in accordance with standard design criteria in areas underlying rock to enable future project maintenance to the project depth of 6 feet, which would not be possible if the rock were removed only to a 6-foot depth at this time. The project plan is shown on the attached map.

12. The plan of improvement described above is considered to be the most feasible plan to provide desirable accommodations for the present and prospective fishing fleet and would eliminate tidal delays. The proposed work will be undertaken by bucket dredging with disposal in approved deep water dumping ground which, in view of the nature of the material, is the only practicable method for this project.

DEPARTURES FROM PROJECT DOCUMENT PLAN

13. Minor changes in the basin dimensions have been made to avoid ledge outcrops and boulders. No change is contemplated in the 1-foot overdepth dredging.

COST ESTIMATES

14. The estimate of project cost determined in the authorizing document was based on the removal of 24,800 cubic yards of ordinary material including mud, sand, and gravel, and the removal of 1,500 cubic yards of rock at an estimated construction cost of \$205,000. It was anticipated that dredging would be accomplished by bucket dredge with disposal of waste materials at sea. The current estimate of cost is based on quantities determined by hydrographic, probing, and boring surveys made in April and May 1963 and include an allowance of one foot of overdepth dredging to provide for inaccuracies in the dredging process. The amount of overdepth dredging is estimated at 6,000 cubic yards of ordinary material and overburden and 400 cubic yards of rock. The cost is based on bucket dredge disposal at sea and prices prevailing in June 1963. The work will

require removal of approximately 22,000 cubic yards of ordinary material and overburden and approximately 900 cubic yards of rock.

15. Current Estimate of Costs (June 1963):

Dredging 22,000 c.y. @ \$3.00/cy	\$66,000	
Rock removal 900 c.y. @ \$100/cy	90,000	
Contingencies	<u>15,000</u>	
Total		\$171,000
Preauthorization studies	10,000	
Engineering and Design	17,000	
Supervision and Administration	<u>20,000</u>	
Total Cost (Federal Funds and Non-Federal Contribution)		218,000
Aids to Navigation (Coast Guard)	-0-	
Berth improvements	20,000	
Public Landing	<u>10,000</u>	
Total		<u>30,000</u>

Total Federal and Required Non-Federal Costs \$248,000

16. Comparison of Costs:

	Document Estimate (Feb. 1962)	Latest Approved Estimate (July 1962)	Current Estimate (June 1963)
Volume: Dredging	24,800 c.y.	24,800 c.y.	22,000 c.y.
Rock	1,500 c.y.	1,500 c.y.	900 c.y.
Channels: Dredging	\$37,000	\$37,000	\$66,000
Rock removal	113,000	113,000	90,000
Contingencies	<u>23,000</u>	<u>23,000</u>	<u>15,000</u>
Total	\$173,000	\$173,000	\$171,000
Preauthorization Studies	10,000	10,000	10,000
Engineering and Design	8,000	17,000	17,000
Supervision and Administration	<u>24,000</u>	<u>20,000</u>	<u>20,000</u>
Total Fed. Funds & Non-Fed. Contribution	\$215,000	\$220,000	\$218,000
Aids to Navigation (C.G.)	0	0	0
Berth Improvements (Non-Fed)	18,000	20,000	20,000
Public Landing (Non-Fed)	<u>7,000</u>	<u>10,000</u>	<u>10,000</u>
TOTAL (Federal and Required Non-Fed. Costs)	\$240,000	\$250,000	\$248,000

17. Allocation of Costs:

	Document Estimate (Feb.1962)	Latest Approved Estimate (July 1962)	Current Estimate (June 1963)
<u>Federal</u>			
Dredging and Rock Removal, Incl Contingencies	\$173,000	\$173,000	\$171,000
Preauthorization Studies	10,000	10,000	10,000
Engineering and Design	8,000	17,000	17,000
Supervision and Administration	24,000	20,000	20,000
Totals	\$215,000	\$220,000	\$218,000
 Aids to Navigation (Coast Guard)	 -0-	 -0-	 -0-
Total Federal Costs	\$215,000	\$220,000	\$218,000
 <u>Non-Federal</u>			
Cash Contribution	-0-	-0-	-0-
Other Costs			
Berth improvements	18,000	20,000	20,000
Public Landing	7,000	10,000	10,000
Totals	\$25,000	\$30,000	\$30,000
Total Non-Fed. Costs	\$25,000	\$30,000	\$30,000
Total Federal and Required Non-Federal Costs . . .	\$240,000	\$250,000	\$248,000

SCHEDULES FOR DESIGN AND CONSTRUCTION

18. Construction of the project requires the removal and disposal of approximately 22,000 cubic yards of ordinary material and 900 cubic yards of rock estimated to require three months of operations. Field investigations consisting of detailed topographic and hydrographic surveys, including probings and borings, are used as a basis for this design memorandum and the bidding documents.

19. The present schedule for construction of the project modification follows:

a. Issue plans and specifications	7 June 1963
b. Open bids	25 June 1963
c. Award contract	9 July 1963
d. Start construction	5 Aug. 1963
e. Complete construction	5 Nov. 1963

20. The construction will be completed by contract work.

Fund Requirements

Allotted to date	\$27,000 *
Additional funds required to complete	181,000

*Includes \$10,000 preauthorization study costs.

OPERATION AND MAINTENANCE

21. Maintenance of the project is the responsibility of the United States and will consist of periodic dredging to restore project depths within the limits of the authorized Federal project modification. The annual maintenance cost is estimated at \$1,200, based on an average annual deposition over the dredged area of 400 cubic yards.

BENEFITS

22. The benefits expected to accrue from construction of the improvement amount to \$16,100, consisting of the following:

Benefits - Commercial

Reduction in Operating Cost to Commercial Vessels due to elimination of Tidal Delays	\$ 6,700
Elimination of Tidal Delays to Fishing Vessels and providing Access to Public Landing	<u>9,400</u>
Total Benefits	\$16,100

23. Annual charges computed in the authorizing document were based on a 100-year project life at an interest rate of 2-5/8% of the Federal investment. Current annual charges are computed at an interest rate of 2-7/8% over a 50-year project life. The non-Federal investment has been excluded as the berth improvements and public landing are considered self-liquidating.

Annual Charges

Investment	\$218,000
Project life	50 years
Interest rate	2-7/8%
Interest and amortization	\$ 8,270
Maintenance	<u>1,200</u>
Total Annual Charges	\$ 9,470

24. A comparison of annual benefits of \$16,100 to the estimated annual charges of \$9,470 yields a current benefit-cost ratio of 1.7 to 1.

RECOMMENDATIONS

25. The plan of improvement proposed in this design memorandum provides for an anchorage extension about 3-1/4 acres, 10 feet deep at mean low water in the northwest section of the harbor and approximately 50 feet off the wharves; also, an access channel and turning basin 6 feet deep at mean low water 75 feet wide and 325 feet long, widening to 155 feet for a distance of 175 feet in the vicinity of the proposed Town landing. This project plan will serve adequately the present needs of the harbor and economically is justified. It is recommended that the authorized project be constructed as described.

Incl - Map (1)

